

Respirators

Chapter 296-842 WAC

Resources

Helpful Tools

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Information About Respirator Selection and Classification

Use with Chapter 296-842 WAC, Respirators

This tool provides guidance about respirator selection and classification for users who aren't familiar with these topics.

When do respiratory hazards occur?

Respiratory hazards that require use of respirators can occur during:

- Routine tasks
- Tasks that occur infrequently such as monthly cleaning of a reactor vessel or chemical storage tank
- Emergencies such as rescue, response to a chemical spill, or circumstances where employees must escape from toxic atmospheres.

Am I qualified to select respirators?

To determine this, you'll need to consider:

- The complexity of your employees' exposures to respiratory hazards and respirator use circumstances.
- If you have a suitable level of technical knowledge and experience with respirators to address respiratory hazards and use circumstances.

For example, individuals selecting respirators solely for wood dust exposure wouldn't need as high a level of knowledge and experience as individuals selecting respirators for multiple contaminants or for highly hazardous circumstances such as emergencies.

What types of respirators are available?

All respirator types can be sorted into 2 main categories as shown. Some respirator models that combine features from both categories are also available, but aren't shown here.

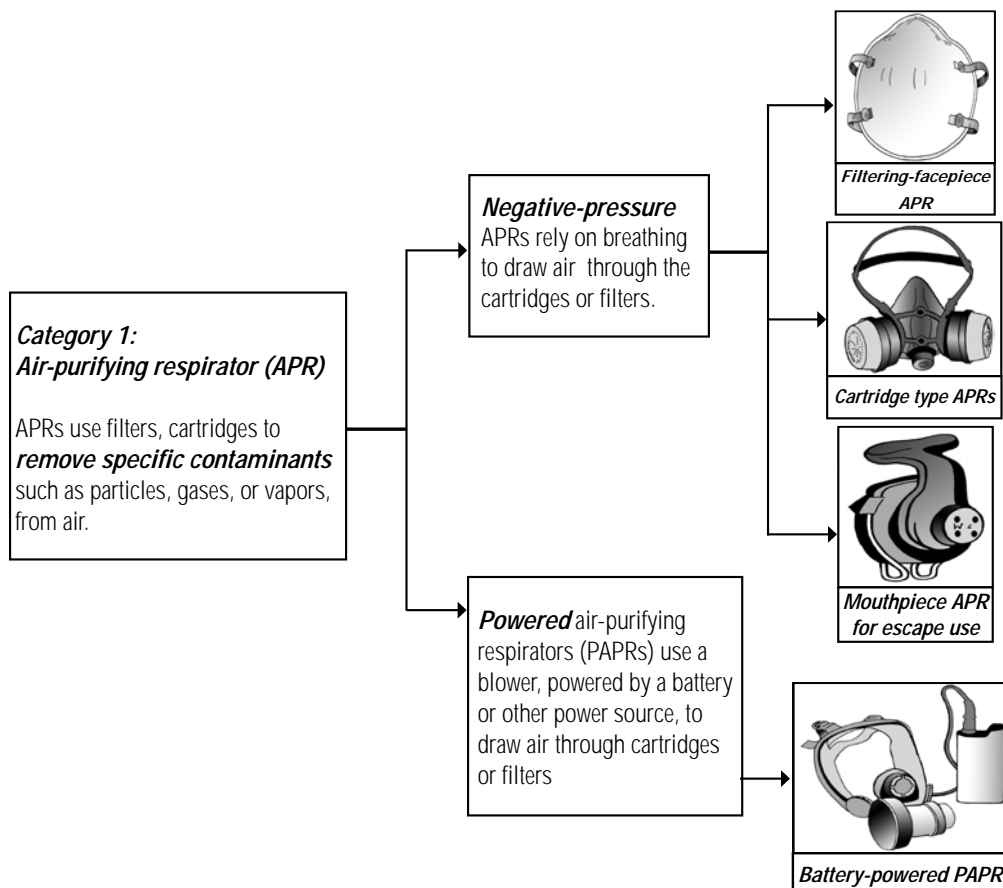
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Information About Respirator Selection and Classification

Use with Chapter 296-842 WAC, Respirators

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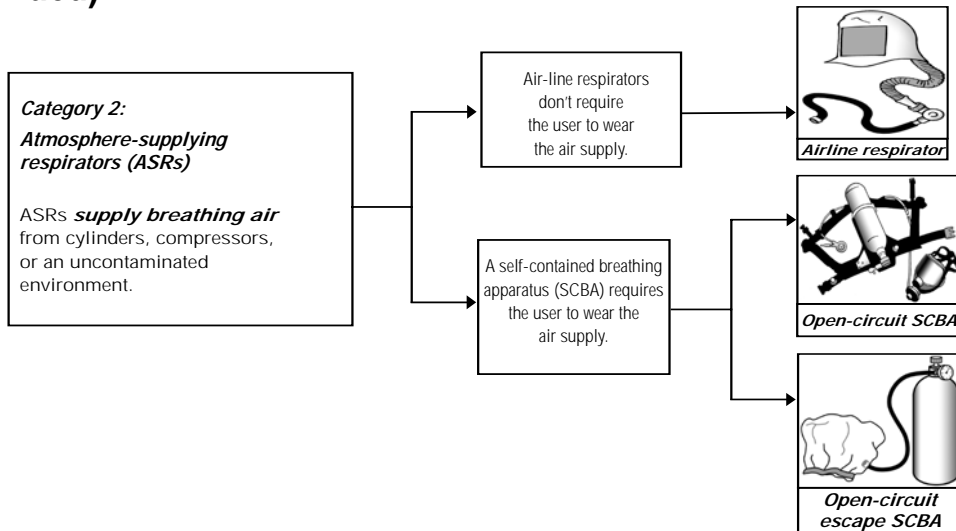
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Information About Respirator Selection and Classification

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Where can I find more information about respirators and selection?

Resources include:

- OSHA's Respiratory Protection Advisor. - Visit www.osha.gov
- NIOSH's 1987 Decision Logic. - Visit www.cdc.gov/niosh
- The Centers for Disease Control and Prevention (CDC).- Visit www.cdc.gov to find information on biological agents such as TB, hanta virus, psittacosis and anthrax
- Respirator manufacturers' on-line selection guides and other information. – Visit www.lni.wa.gov/wisha and select the Respiratory Protection topic page to find a list of respirator manufacturers and website links
- The American National Standard for Respiratory Protection, ANSI Z88.2-1992, or most recent edition. - Visit www.ansi.org to find out how to obtain a copy or contact your local librarian for access.
- WISHA. Visit www.lni.wa.gov/wisha/consultation for a list of WISHA consultants available for assistance.
- Experienced respirator distributors, and private industrial hygiene consulting services listed in your local phone book.



Notes

Using Assigned Protection Factors (APFs) for Respirator Selection

Use with Chapter 296-842 WAC, Respirators

Important!

Use this tool if you need help using the APFs in Table 5 of Chapter 296-842 WAC, Respirators.

- This tool is designed to compare hazard ratios (these are values that rate the level of employee protection needed) to APFs (these are values that rate the expected level of protection provided by different types of respirators under ideal conditions) to determine which respirator types are acceptable pending further selection criteria in Chapter 296-842 WAC, Respirators.

If exposure circumstances in your workplace aren't addressed by this tool, contact your local WISHA consultant.

- See www.lni.wa.gov/wisha/consultation for a list of consultants to assist you
or
- Go to the Resources section of Chapter 296-800 WAC, Safety and Health Core Rules, for a list of service locations in your area

Step 1: Make sure you start by having this information available:

- Estimated or measured employee exposure concentration values for each respiratory hazard identified during your exposure evaluation.

Reference:

See Chapter 296-841 WAC, Respiratory Hazards, if you haven't completed an exposure evaluation.

- WISHA's permissible exposure limit (PEL) value.
 - There are 3 types of PEL values:
 - 8-hour, time-weighted average (TWA₈) value
 - Short-term exposure limit (STEL) value
 - Ceiling (C) limit value
 - You only need the PEL values that exposure evaluation results show are exceeded. For example, if employee exposure concentrations exceed the TWA₈, but **not** the STEL or Ceiling limit, you will only need the TWA₈ value.

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Using Assigned Protection Factors (APFs) for Respirator Selection

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Step 2: Calculate hazard ratio values for **each** substance using this formula:

$$\text{Hazard ratio} = \frac{\text{Concentration in ppm (or mg/ M}^3\text{)}}{\text{PEL in ppm (or mg/ M}^3\text{)}}$$

- Use **Table HT-1** to define the terms in the formula.

Table HT-1 Key to Formula symbols	
<i>The term</i>	<i>Is the</i>
Concentration	Estimated or measured concentration of the respiratory hazard during an 8-hour or a short-term exposure period, determined during your hazard evaluation
PEL	WISHA Permissible Exposure Limit (PEL) established for the substance
*ppm	Concentration units in parts per million
*mg/ M ³	Concentration units in milligrams per cubic meter
*Concentration units (ppm or mg/ M ³) used in the formula for "Concentration" and "PEL" must be the same. If they are different, contact your local WISHA consultant or your laboratory to get help with converting your "Concentration" value.	

- Calculate the hazard ratio, using the formula, for 8-hour exposure periods when exposures exceed the WISHA TWA₈ value.
- Calculate the hazard ratio, using the formula, for short-term exposure periods when exposures exceed the WISHA STEL value.
- If you are uncertain about this step, review this example:

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Using Assigned Protection Factors (APFs) for Respirator Selection

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Example 1: Your employees are exposed to a **single** airborne substance.
Calculate hazard ratios based on the information in **Table HT-2**.

Table HT-2
Example 1: Exposure Evaluation Information

- WISHA's PELs for the substance are:
 - 50 mg/M³ = TWA₈
 - 150 mg/M³ = STEL
- Your hazard evaluation results show employees are exposed to the substance at concentrations above WISHA's TWA₈ and STEL. These results are reported as:
 - 300 mg/M³ averaged over an 8-hour exposure period
 - 600 mg/M³ averaged over a 15-minute (short-term) exposure period

You will need to calculate 2 hazard ratio values since evaluation results show employees are exposed above WISHA's TWA₈ and STEL.

Put the **8-hour** values for "PEL" and "Concentration" into the formula and calculate the hazard ratio

$$\frac{\text{Concentration}}{\text{PEL}} = \frac{300 \text{ mg/M}^3}{50 \text{ mg/M}^3} = \boxed{\text{A hazard ratio of 6 for the 8-hour exposure period}}$$

Put the **short-term** values for "PEL" and "Concentration" into the formula and calculate the hazard ratio

$$\frac{\text{Concentration}}{\text{PEL}} = \frac{600 \text{ mg/M}^3}{150 \text{ mg/M}^3} = \boxed{\text{A hazard ratio of 4 for the short-term exposure period}}$$

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Using Assigned Protection Factors (APFs) for Respirator Selection

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Step 3: If the respiratory hazard is a **single** substance, select the highest hazard ratio value and skip to Step 6.

If the respiratory hazard is a **mixture** of substances, you'll need to determine if substances in the mixture have additive health effects. After this determination, go to Step 4.

Reference:

If you haven't evaluated the substances to find out if they have additive health effects, follow the guidance in Steps 1 & 2 of the **Mixtures of Substances** Helpful tool, located in the Resources section of Chapter 296-842 WAC, Respirators.

Step 4: If substances in the mixture do **not** have additive health effects, select the highest hazard ratio value and skip to Step 6.

Step 5: When substances in the mixture have additive health effects, add up the hazard ratio values of exposure periods to get a total value for each exposure period. Select the highest hazard ratio total.

If you are uncertain about this step, review this example:

Example 2:

- Employees are exposed to a mixture of 2 substances with additive health effects. Select the highest hazard ratio total.
- Hazard ratios for each substance and totals for each exposure are shown in **Table HT-3**.
- The highest ratio total is 15.

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Using Assigned Protection Factors (APFs) for Respirator Selection

Use with Chapter 296-842 WAC, Respirators

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<i>Table HT-3</i>		
<i>Example 2: Hazard Ratios and Totals</i>		
<i>Identity of the substance</i>	<i>Hazard Ratios for the 8- hour exposure period</i>	<i>Hazard ratios for the short-term exposure period</i>
Substance 1	10	4
Substance 2	5	1
	Total = 15	Total = 5

Step 6: Compare your hazard ratio value to the APF values in Table 5 of Chapter 296-842 WAC, Respirators.

and

Note any respirator types in Table 5 with an APF **equal or more than** your hazard ratio.

- These respirator types are capable of providing a sufficient protection level for your workplace exposure concentrations; **however**, other selection requirements found in WAC 296-842-13005, Select and Provide Appropriate Respirators, must be followed to determine your final respirator selection outcome.

If you are uncertain about this step, review these examples:

Example 3:

- A hazard ratio of 3 has been determined.
- Which respirator types are acceptable for further selection consideration?
 - All APFs shown in Table 5 of Chapter 296-842 WAC, Respirators, have an APF that's more than 3, so all types of respirators are acceptable for further selection consideration.

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Using Assigned Protection Factors (APFs) for Respirator Selection

Use with Chapter 296-842 WAC, Respirators

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Example 4:

- A hazard ratio of 12 has been determined.
- Which respirator types are acceptable for further selection consideration?
 - Respirator types shown in Table 5 of Chapter 296-842, Respirators, with an APF of 25 or more, are acceptable for further selection consideration. In this case, all other respirators must be excluded from your selection process.



Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators

This tool will help you understand how to find and use NIOSH certification information.

Why is NIOSH certification important?

NIOSH certified respirators are rigorously checked and tested to make sure they can perform well and are suitable for workplace use. These assurances don't extend to respirators that aren't NIOSH certified.

How do I know if a respirator has been NIOSH certified?

You can't always tell by examining the respirator. If it's NIOSH certified, it'll have an approval label somewhere on the product box or on printed materials contained in the box.

The label will include "TC" numbers along with important caution and limitation information about the respirator's use.

How do I use TC numbers?

These numbers help you know which parts are acceptable to use on each respirator assembly.

When making repairs, make sure replacement parts used are listed under the TC number for the assembly chosen, otherwise, you will create a non-certified respirator assembly.

Each respirator assembly has one TC number. If more than one TC number is listed on the approval label, this means more than one NIOSH-certified assembly is available.

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Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators

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Does NIOSH certification expire?

No. However, NIOSH certification is voided when:

- Users don't follow the approval label's use specifications, including listed cautions and limitations
- Respirator parts used aren't listed under the respirator assembly's TC number

NIOSH occasionally withdraws certification for a respirator assembly. When this happens, a user notice is posted on their website at

www.cdc.gov/niosh/respnotices.html

What are N, R, and P series respirators?

N, R, and P are NIOSH certification categories that apply to negative-pressure air-purifying respirators that protect against hazardous particles. They do **not** apply to powered air-purifying respirators (PAPRs).

N, R, and P respirators are also called particulate respirators because they use filter material to protect users from airborne dusts, sprays, mists, fumes, and other solid or liquid particle contaminants.

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Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators

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What do the designations N, R, and P mean?

These designations refer to the use restrictions for respirator categories shown in **Table HT-1**.

Table HT-1 Use Restrictions for N, R, and P Respirator Categories	
Use	When
N	No oil is present in the air.
R	Oil is present, but only for a single shift or 8 hours of continuous or intermittent use. Note: Reuse beyond a single shift or 8 hours is not recommended.
P	Oil is present, but follow the manufacturer's time use limitations if you want to reuse these.

For more information about limitations and capabilities of these respirators, see the May 2, 1997 NIOSH Respirator User's Notice, "Letter to All Users of P-Series Particulate Respirators" or visit: www.cdc.gov/niosh.htm.

What do the designations 100, 99, and 95 mean?

Table HT-2 shows how efficient the respirator's filter capability is expected to be against particles that are at least 0.3 micrometers. The higher the number, the higher the efficiency expected.

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Key Information About NIOSH Certified Respirators

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Table HT-2 Efficiency Levels for N, R, and P Respirators	
If the efficiency level is	This means
100	The filter is expected to trap 99.97 particles out of every 100. It is as efficient as a High Efficiency Particulate Air (HEPA) filter.
99	The filter is expected to trap 99 particles out of every 100.
95	The filter will trap 95 particles out of every 100. Note: For many exposure situations, this level is adequate.

Can I still use particulate respirators certified for “dust” or “dust, fumes and mists”?

These air-purifying particle-removing respirators are no longer easy to find. They were certified under NIOSH's former standard, 30 CFR Part 11, replaced by 42 CFR Part 84, and can no longer be sold for occupational use.

Also, due to less stringent testing of these respirators, you can only use them when you can prove the particulate contaminants involved are 2 micrometers or **larger** in size.

If you have particle contaminants that are **smaller** than 2 micrometers, you'll need to use an N, R, or P series respirator instead.

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Key Information About NIOSH Certified Respirators

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Where can I find NIOSH certification requirements?

NIOSH certification requirements are in the federal regulation, Title 42 CFR, Part 84, Respiratory Protective Devices. This regulation replaced 30 CFR Part 11 in 1995.

You can find this standard, in its entirety by visiting:

<http://www.access.gpo.gov/nara/cfr/index.html>



Notes

Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators

This information can help you prepare for employee medical evaluations required by Chapter 296-842 WAC, Respirators. This information doesn't apply to medical evaluation requirements found in other WISHA rules.

Who is allowed to perform medical evaluations?

Only licensed health care professionals (LHCPs) are allowed to perform these evaluations. You may use:

- On-site medical staff
- or**
- Medical staff from outside services

In Washington state LHCPs include:

- Physicians
- Physician Assistants (PAs)
- Advanced Registered Nurse Practitioners (ARNPs)
- Registered Nurses

What medical questionnaire is required?

Use any of the following:

- The WISHA Medical Evaluation Questionnaire provided in WAC 296-842-220, Required Procedures for Respiratory Protection Program.
- The OSHA Respirator Medical Evaluation Questionnaire found in Appendix C of 29 Code of Federal Regulations (CFR), Part 1910.134, Respiratory Protection.
- Questionnaires developed by other parties, such as on-line services, if these questionnaires include the same questions found in Parts 1-3 of the WISHA Medical Evaluation Questionnaire.
 - A LHCP may add questions or change the order of required questions.
 - In some cases, questions added by the LHCP before administering the questionnaire can minimize the need for LHCP follow-up.

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Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators

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Is there an alternative to using a questionnaire for employee evaluations?

Yes. You can choose to have medical exams conducted instead of using the questionnaire, as long as you make sure the exam obtains the same information as found in the questionnaire.

Why is confidentiality important?

Aside from legal considerations, confidentiality encourages employees to provide complete and correct health information for the LHCP's evaluation. This helps make sure reliable medical evaluations are provided.

How do I maintain confidentiality during questionnaire administration?

Here are some strategies to consider when planning for evaluations:

- Make arrangements to have a LHCP administer the questionnaire at the workplace.
- Allow the employee to self-administer the questionnaire and mail it, postage paid, to the LHCP.
 - Since employees may have questions about medical issues, arrange for an LHCP to be available by telephone or e-mail during the time the questionnaire is being administered.
- If you decide to have an individual administer the questionnaire who isn't a LHCP:
 - Instruct the individual **not** to look at the employee's questionnaire at any time
 - Provide pre-addressed, stamped envelopes for completed questionnaires
 - Instruct employees to place their completed questionnaires in the envelope, seal it, and mail or forward it to the LHCP
 - Have the employee use an on-line questionnaire service that meets the requirements in WAC 296-842-14005, Provide Medical Evaluations.

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Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators

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What if my employee can't read the questionnaire?

Find out if language translation services are needed, or if employees need help with reading.

- If language translation services are needed you can use:
 - An interpreter. It's not necessary to provide a professional interpreter. Interpreters can be an individual trusted by the employee such as a co-worker, friend, family member, or the LHCP.
 - A translated version of the questionnaire when available. For a Spanish-language version visit <http://www.lni.wa.gov/WISHA>
 - If reading assistance is needed, make arrangements ahead of time to use an individual trusted by the employee to assist them while filling out the questionnaire.
- While making these arrangements remember to address any possible confidentiality issues that could arise.



Notes
